

What is claimed is:

1. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less;

and

delivering or sampling an agent through said microslits.

2. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less;

and

delivering or sampling a drug through said microslits.

3. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less;

and

delivering or sampling a vaccine through said microslits.

4. A method of delivering or sampling an one or more agents through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

providing a coating of at least one of said agents on said one or more stratum corneum piercing microprotrusion;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm^2 of the microprotrusion member in 10 milliseconds or less; and

delivering or sampling at least one of said one or more agents through said microslits;

5. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.1 joules per cm^2 of the microprotrusion member in 10 milliseconds or less; and

delivering or sampling an agent through said microslits.

6. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm^2 of the microprotrusion member in 1 millisecond or less; and

delivering or sampling an agent through said microslits.

7. A method of delivering or sampling a body analyte through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less; and

delivering or sampling a body analyte through said microslits.

8. A method of delivering or sampling a body analyte through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less; and

delivering or sampling glucose through said microslits.

9. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions; wherein said microprotrusions have a length of less than 500 μm ;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less; and

delivering or sampling an agent through said microslits.

10. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microblades;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less; and

delivering or sampling an agent through said microslits.

11. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum activating an impact applicator so that said microprotrusions impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less; and

delivering or sampling an agent through said microslits.

12. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum activating an impact applicator so that said microprotrusions impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less;

wherein the impact applicator is activated when the applicator is held against the stratum corneum with a hold down force of at least 0.5 kg; and
delivering or sampling an agent through said microslits.

13. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum activating an impact applicator so that said microprotrusions impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less;

wherein the impact applicator is activated when the applicator is held against the stratum corneum with a hold down force of at least 0.5 kg; said applicator being driven by an energy source selected from the group consisting of a biasing member, pressure, electricity and magnetism; and delivering or sampling an agent through said microslits.

14. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum activating an impact applicator so that said microprotrusions impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less;

wherein the impact applicator is activated when the applicator is held against the stratum corneum with a hold down force of at least 0.5 kg; said applicator being driven by an energy source selected from the group consisting of a spring, pressure, electricity and magnetism; and

delivering or sampling an agent through said microslits.

15. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum activating an impact applicator so that said microprotrusions impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less;

wherein the impact applicator is activated when the applicator is held against the stratum corneum with a hold down force of at least 0.5 kg; said applicator being driven by an energy source selected from the group consisting of a spring, pressure, electricity and magnetism; wherein said pressure is selected from the group consisting of positive pressure, partial vacuum and a combination thereof; and

delivering or sampling an agent through said microslits.

16. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

an applicator having a contacting surface; and

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less.

17. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

an applicator having a contacting surface; said applicator being driven by an energy source selected from the group consisting of a biasing member, pressure, electricity and magnetism

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less.

18. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

an applicator having a contacting surface; said applicator being driven by an energy source selected from the group consisting of a spring, pressure, electricity and magnetism; and

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less.

19. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

an applicator having a contacting surface; said applicator being driven by an energy source selected from the group consisting of a spring, pressure, electricity and magnetism; said spring being an impact spring and capable of applying an impact having a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less; and

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less.

20. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

an applicator having a contacting surface; and

a microprotrusion member having one or more stratum corneum piercing microblades, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less.

21. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

- an applicator having a contacting surface;
- a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less; and
- a hold down spring for achieving a hold down force required for device activation.

22. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

- an applicator having a contacting surface;
- a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less; and
- a hold down spring; said hold down spring requiring a hold down force of at least 0.5 kg be applied to the applicator before activation of said applicator.

23. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

- an applicator having a contacting surface;
- a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting

surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less;

a hold down spring; said hold down spring requiring a hold down force of at least 0.5 kg be applied to the applicator before activation of said applicator; and

an indicator which indicates when a predetermined hold down force is applied to said applicator.

24. - A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

an applicator having a contacting surface;

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less;

a hold down spring; said hold down spring requiring a hold down force of at least 0.5 kg be applied to the applicator before activation of said applicator; and

an indicator which indicates when a predetermined hold down force is applied to said applicator; wherein said indicator provides an audible, tactile, or visible signal to indicate when said predetermined hold down force is applied.

25. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

an applicator having a contacting surface; and

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that

26. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less; wherein said applicator is activated when the applicator is pressed against the stratum corneum with a force of at least 0.5 kg.

an applicator having a contacting surface; and

28. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at

least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less;
said microprotrusion having a length less than about 500 μm.

29. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

an agent;

an applicator having a contacting surface; and

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less.

30. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

an agent selected from the group consisting of a drug and a vaccine;

an applicator having a contacting surface; and

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less.

31. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

an agent ;

an applicator having a contacting surface; and

a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that

said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less; and

wherein said agent is coated on one or more of said microprotrusions.

32. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

- an agent reservoir capable of collecting a body analyte;
- an applicator having a contacting surface; and
- a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less.

33. A device for forming one or more microslits through the stratum corneum through which an agent can be delivered or sampled, comprising:

- a beneficial agent;
- a reservoir containing said beneficial agent therein, said reservoir being capable of being placed in agent transmitting relation with the stratum corneum;
- an applicator having a contacting surface; and
- a microprotrusion member having one or more stratum corneum piercing microprotrusions, the microprotrusion member being releasably mounted on said applicator, wherein said applicator, once activated, brings said contacting surface into contact with said microprotrusion member in such a manner that said microprotrusion member strikes the stratum corneum with a power of at least 0.05 joules per cm² of microprotrusion member in 10 milliseconds or less.

34. A method of delivering or sampling an agent through the stratum corneum, comprising:

- providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less.

35. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.1 joules per cm² of the microprotrusion member in 10 milliseconds or less.

36. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 1 millisecond or less.

37. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microprotrusions; said microprotrusion having a length of less than 500 μm;

forming one or more microslits through the stratum corneum by causing said microprotrusions to impact the stratum corneum with a power of at least 0.05 joules per cm² of the microprotrusion member in 10 milliseconds or less.

38. A method of delivering or sampling an agent through the stratum corneum, comprising:

providing a microprotrusion member having one or more stratum corneum-piercing microblades;

39. A device for impacting a microprotrusion member, said microprotrusion member having thereon one or more microprotrusions, said microprotrusion member adapted to form one or more microslits through the stratum corneum through which an agent can be delivered or sampled, said device comprising:

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